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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,112	02/27/2002	Masaaki Higashitani	AF01047	2733

7590

08/15/2003

WAGNER, MURABITO & HAO LLP
Third Floor
Two North Market Street
San Jose, CA 95113

EXAMINER

BOOTH, RICHARD A

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 08/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/086,112

Applicant(s)

HIGASHITANI ET AL.

Examiner

Richard A. Booth

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 and 28-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5, 10 and 11 is/are rejected.
- 7) ☒ Claim(s) 6-9 and 12-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of the first species in Paper No. 5 is acknowledged. Furthermore, applicant's note that only claims 5-27 are directed to this species, since claims 28-32 are directed to the nonelected group I.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 5 and 10-11 are rejected under 35 USC (e) as being anticipated by Pham et al., U.S. Patent 6,261,904 B1.

Pham et al. shows the invention as claimed including a method of forming a semiconductor structure, comprising: forming a charge-trapping structure on a substrate, wherein said charge-trapping structure comprises:

a first ONO structure 24 on a first portion of said substrate; a second ONO structure 24 on a second portion of said substrate, wherein said first portion does not completely overlap said second portion; and a gate oxide 48 between said first and second ONO structures; and said ONO structures comprise a nitride layer between a

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first oxide layer and a second oxide layer (see figs. 1-14 and col. 4-line 34 to col. 8-line 35).

Claims 5 and 10-11 are rejected under 35 USC (e) as being anticipated by Wang et al., U.S. Patent 6,562,683 B1.

Wang et al. shows the invention as claimed including a method of forming a semiconductor structure, comprising: forming a charge-trapping structure on a substrate, wherein said charge-trapping structure comprises:

a first ONO structure 12 on a first portion of said substrate; a second ONO structure 12 on a second portion of said substrate, wherein said first portion does not completely overlap said second portion; and a gate oxide 40 between said first and second ONO structures; and said ONO structures comprise a nitride layer between a first oxide layer and a second oxide layer (see figs. 1-6 and col. 3-line 23 to col. 4-line 41).

Claims 5 and 10-11 are rejected under 35 USC (e) as being anticipated by Yang et al., U.S. Patent 6,403,420 B1.

Yang et al. shows the invention as claimed including a method of forming a semiconductor structure, comprising: forming a charge-trapping structure on a substrate, wherein said charge-trapping structure comprises:

a first ONO structure 161 on a first portion of said substrate; a second ONO structure 162 on a second portion of said substrate, wherein said first portion does not

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completely overlap said second portion; and a gate oxide 180 between said first and second ONO structures; and said ONO structures comprise a nitride layer between a first oxide layer and a second oxide layer (see figs. 3A-3G and col.2-line 50 to col. 3-line 25).

Allowable Subject Matter

Claims 6-9 and 12-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art, either singly or in combination, fails to anticipate or render obvious, the limitations of: removing a portion of said remaining thick oxide layer from said oxide-conductive-layer columns to form a recess and said gate oxide; growing a thin oxide layer over said memory portion of said substrate, the portion of said thin oxide layer in the lower region of said recess forming said first oxide layer and the portion of said thin oxide layer in the upper region of said recess forming said second oxide layer, as required by dependent claims 6 and 20, and forming an oxide-conductive layer on said substrate, said oxide-conductive layer comprising a first conductive layer on a thick oxide layer, and forming an ONO layer within said memory portion of said substrate, said ONO layer comprising said nitride layer between said first oxide layer and said second oxide layer, and removing said ONO layer except from the regions adjacent to said oxide-conductive-layer columns to form said ONO structures, as required by dependent claims 14 and 24.

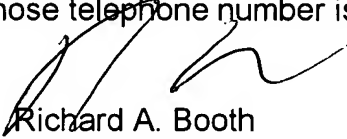
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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard A. Booth whose telephone number is 308-3446. The examiner can normally be reached on Monday-Thursday from 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are 308-7724 for regular communications and 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-1782.



Richard A. Booth
Primary Examiner
Art Unit 2812

August 11, 2003